

040786

LONG
ISLAND GROUP
SINCLAIR
TIMEX

L.I.S.T.ING

April
1986

Issue Price \$ 50

MEETING NOTES - MARCH 16, 1986

The March meeting of LIST was called to order at 2:00PM on Sunday, the 16th, at the Huntington Public Library. There were 27 attendees. The Treasury was reported to contain \$928.84, of which \$150 was owed to Paul Donnelly for the publication of the March Newsletter. Membership was reported at 98 paid members prior to the meeting (this increased to 100 by the end of the day).

Chuck Russell commended Myles Cohen's work on the data base, and called for more volunteers to enter the information on other newsletters. Members who feel they would like to review exchange newsletters, first hand, and feel they could spare a few minutes per week are encouraged to call Jeff Street. The job entails entering such information as Title, Author, Issue and Page numbers, and subject matters for the articles in particular newsletters, into our copy of PRO/FILE.

A phone chain, for inclement weather, was discussed. Notice will be placed on the Zebra Bulletin Board, if a meeting is cancelled. In addition, members may call the meeting site. If the Library is closed, the meeting is cancelled. Finally, if still in doubt, call Chuck Russell.

Returns of Library tape 4.X have finally begun to arrive and tape 5.1 is now ready. It will be beta tested after the next meeting and then duplicated and dispatched. Please remember to let us know if you belong in a special interest group (e.g., TS 1000 only) or have never received a tape. Our records have some gaps and you might be in one. Response from other user groups has, so far, been thin. Please note that while much of the LIST Library tape is not copyrighted and some is public domain, we consider the actual tapes to be the private property of paid LIST members. Members were reminded that they pay their \$15 dues in order to obtain their copy and that they have either created and/or entered the programs by pounding their keyboards. Providing the tapes to outsiders is a disservice to other members and abuse of membership rights.

The Midwest Computerfest (May 3 & 4) and Trenton Computer festival were discussed. A vote to pay for the admittance of a member who would distribute LIST literature was taken and passed. The TCC is April 19th & 20th and the member will be selected next meeting. So far only Martin H has volunteered. We will be asking Zebra for help, as well.

Again on Library tapes a plea was made for identifying the computer to be used. Please note if your program is 2068 or Spectrum somewhere in the program itself. Some members have begun doing this and it is a big help. If your program is Spectrum only and won't even load successfully or a 2068, add a BASIC Loader which says so before the actual program.

Complaints were made about light printing in the March issue. We will make every effort to correct this situation. If a member must have specific information they may send in an SASE and we will try to make copies of specified pages. Please do not make such requests unless you must have the information.

Cedric B. demoed his internally mounted T198 keyboard for the TS 2068. He notes there are several versions of this board on the Surplus market (Bob G. says he knows of 4) and only the ALPS board from Japan can be easily fitted into the TS 2068 case. See Cedric's article for details of this outstanding project. Cedric's craftsmanship was truly impressive.

A LIST BBS was again discussed. Chuck has checked with the phone company. Line charge is \$113 and it would cost \$8.13/month for the phone line. Zebra has expressed an interest in helping us fund and run such a system, but much more discussion is required.

Bob G. noted that he has found where most of the 3" disks are going - Mainland China.

NEXT MEETING

April 13th @ 2:00PM - Huntington Library - Theme-Making Archival copies.

May 18th @ 2:00PM - Probably at Huntington Library - Tentative Theme - SWAP meet (exchange used only) hardware & Software)

PRESENTATION

Stewart N. of Zebra gave us a crash course in Modems and Telecommunication. He covered everything from the history of telecommunication, through Bit streams, the RS 232 C standard, Asynch. vs Synchronous communication, Modems, baud rates and Frequency Shift Keying.

Stewart then reviewed the 2050 Modem schematic and commented on what each component did. This hour and 15 minutes session was packed with information on the modem and even the RS 232 port add-on (which is to be published in Time Design).

LIST GROUP

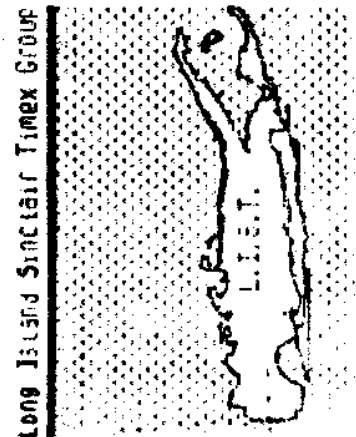
P.O. BOX 438

CENTERPORT, N.Y. 11721-0438

LIST GROUP 1

IN THIS ISSUE

SUBJECT	PAGE
Meeting Notes	1
Index, Classified/Vendors	2
Feature Article - C. Bastiaans Key Board Mania - PT3	3
Improving Zebra Graphics Tablet	6
Library Tapes - P. Donnelly	7
Computer Dictionary	9
Totally Safe MC or TS 1000 - W. Pedersen	10
LIST Printer Information - R. Gilder	11
TS 2068 Bank Switching - P-2 - W. Pedersen	14
Hackers Note Book - I Atari Keyboard on 2068 - P. Donnelly	15
II More on RGB - R. Gilder	18
Letters	20
Policy & Special Offer	21
Map and Mailer	22



SPECIAL NOTE

Harvey Rait, one of the original LIST group members, and a frequent contributor to group activities, will be going into the hospital shortly for an operation.

We all wish Harvey a speedy recovery and hope to see him soon.

ITEMS FOR SALE TIMEX SINCLAIR INVENTORY

1. Timex Sinclair 2068 computer	\$100.00
2. A & J Dual Microdrive vi/vii with interface	\$100.00
3. A & J microformers vrs sizes: Total 52	\$100.00
4. Timex 2068 Printer	\$ 30.00
5. Books inside the 2068- Timex Sinclair Inter. Advanced Guide Source (100 subscriptions in Timex Basic)	\$ 25.00
6. Tassan Interface/Tassan Word Processor-Tassan 7. Miscellaneous tapes, books, programs.	\$ 30.00
8. Olivetti Ink Jet Printer PHE200 with 60 Ink Ampules (1200 each).	\$200.00

Zebra Systems
75-06 Jamaica Avenue
Woodhaven, N.Y. 11421
718-296-2385

R.V. Tubes
104 Abbey Street
Accrington, Lancs-
BB 5 1 22, United Kingdom
(0254)-36521/32611

VENDOR REPORT

Discount on 2068/TS 1000
Hardware. Modem \$10 (no
guarantee). Call for Catalog

Parts - Spectrum ULA -£ 7.20
Z181-ULA -£ 4
Parts for IP 1 and ZX Printer
Repair Manuals e.g., for IP 1 -£

All the above items include manuals, cables, etc. This is
an up and functioning fully operative system.

Will sell separately or as a package at an excellent
price. Tassan GP, VP, file, vi-3d,
Quadrachart, Chess, Comics, and other programs included in
package both on cassette tape and adapted to A & J
Microformers.

Willing to negotiate a package price. Minimum order
Selling Printer separately or with package.

CALL RICHARD J. CLEMMINGHAM
PHONE: (212) 843-0888

Also: Sunset Electronics

New Discounts - call

SUBSCRIPTION NOTICE

Please check your mailing label. Above your last name you
will see the month and year in which you will receive your
last issue of LISTing (LIST) Newsletter. If this number
does not agree with your records please let us know. This
is a good time too, to request information on specific
subjects for next years newsletters or just let us know

IX. FITTING THE TI-99/4A KEYBOARD INTO THE TS 2068 CASE

The TI keyboard which flooded the market after the demise of the TI computer, offers a fine opportunity for you to try your hand at putting a full-travel keyboard to work for one of the finest computers around.

But first a word of warning: Neither LIST nor I can be held responsible for any damage resulting from these proceedings. Once you open up your computer, you are on your own, voiding all warranties, if any.

Also, if changing a light bulb means a major endeavour for you, maybe you should not attempt any of the following...

IX.1 WHICH KEYBOARD?

I know of at least two versions. THE FOLLOWING PROCEDURES ARE ONLY FOR ONE OF THEM! It may be that the other version lends itself to a like modification. But for now, I can only address myself to one item at a time.

The versions in question are (and I am putting the corresponding deviations for the WRONG version in parentheses):

Black keys with white legends (beige keys with grey).

Keys are a trifle hard to remove (easily removable).

Key switches are only numbered 1 through 48 (alpha-numerically indicated)

15-pin ribbon cable connector is numbered 1 thru 15, R to L (not numbered).

The PCB identifications are 1039019-1 (1039019-3), made in Japan (Korea), there is no TI-logo (there is), 94 V-0 (same), made by ALPS (by SE-JIN).

In addition, the PCB TRACES ARE TOTALLY DIFFERENT!

Also, it appears that the Alpha Lock key is not always a Push/Push type. You're in luck if it isn't (see later).

A dead give away is the fact that my keyboard has a RECESSED PCB, in contrast to the other one which has one which is very close to the mounting flanges

The TI keyboard can still be purchased from the Arnold Co. (new for \$5.99 + \$3 shipping), 214 Hill Lane, Red Oak TX 75154 or from the LOLIR ELECTRONICS CORP. (surplus for \$3.75 + \$3.50 shipping), 13933 N. Central Expressway, suite 212, Dallas TX 75243. If you want to order, I suggest you specifically ask for the ALPS keyboard.

Once again, it may be possible to modify the TS 2068 to accept the other KB. If there is enough interest, I just might endeavour to look into it. Write me c/o LIST. (See Note at the end of this article).

IX.2 THE TI MATRIX

The TI matrix is shown in Figure 9. Note that I have labeled the KBD and the A-lines as 1T, 2T etc. This to avoid confusion with the TS 2068 matrix.

At first glance there appears to be a similarity between it and the TS 2068. Aside from the obvious deviations in the B keys, . / ; = CNTL FCTN and Alpha Lock, there is a major problem in that the entire bottom row is shifted over one key!

But fear not, we can lick it. Let's first discuss what to do with the dedicated key functions. It should be obvious that there is no room for such elaborate IC functions as described in Chapter VII of Part 2 of this series. But there remain

some useful ones, such as the comma, the period, the colon, the semi-colon and the Delete key. In addition, I suggest that you use TWO Symbol Shift keys, one on each side of the Keyboard. Then there is the Alpha Lock; we could wire it simply in parallel with the Caps Shift keys. But this has limited usefulness; it is NOT the same as Caps Shift 2, a TRUE caps shift. In contrast, the Alpha Lock does not

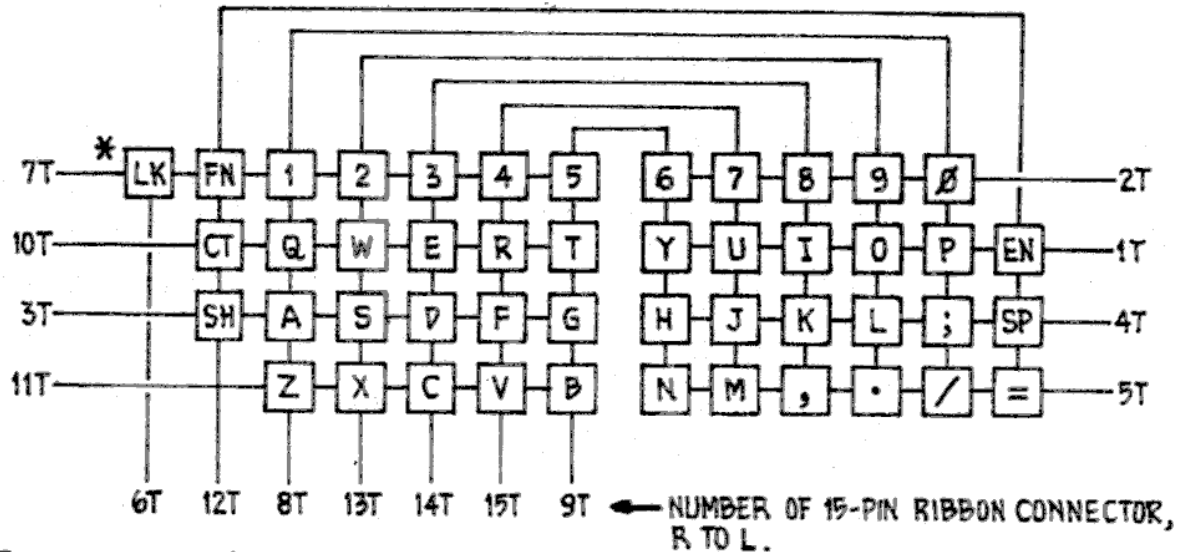


FIGURE 9 * = PUSH/PUSH TYPE LK = LOCK FN = FUNCTION CT = CONTROL SH = SHIFT

allow the punctuation marks to work, nor the numbers, nor the Symbol Shift. It is only useful with the cursor keys and of course the letters.

That's why I elected to use the Alpha Lock key as an asterisk key, to use with the Zebra Disk Drive. One just has to get used to operating it in a quick Push/Push fashion, so as not to cause it to go into a continuous repetition of the character! I have tried in vain, to modify this key. I leave it up to the reader to do with it as he or she sees fit. No further reference will be made to this key, not even as an asterisk key!

IX.3 THE MODIFIED TI MATRIX

Figure 10 shows the TI keyboard as we would want it to be. Quite obviously, the dedicated keys are:

Key Switch 11, for the DELETE key

Key Switch 22, for the COLON key

Key Switch 46 and 48, for the SYMBOL SHIFT keys

Key Switch 32, 42 and 43 for the SEMICOLON, COMMA and PERIOD keys

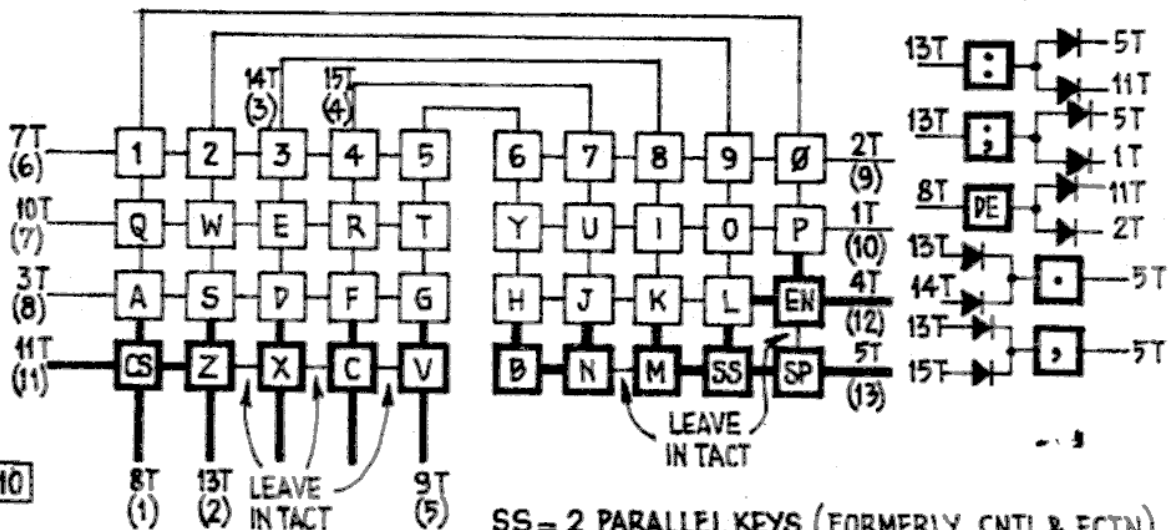


FIGURE 10

NOTE:

[M] = NEW KEY, WITH EXISTING LINE AND A NEW LINE

SS = 2 PARALLEL KEYS (FORMERLY CNTL & FCTN)
: = FORMERLY /-KEY
DE = FORMERLY ==-KEY

This seems like a good time to list all the keys, as we have now defined it:

Switch #	Key	Switch #	Key	Switch #	Key	Switch #	Key
1	1	13	W	25	D	37	C
2	2	14	E	26	F	38	V
3	3	15	R	27	G	39	B
4	4	16	T	28	H	40	N
5	5	17	Y	29	J	41	M
6	6	18	U	30	K	42	,
7	7	19	I	31	L	43	.
8	8	20	O	32	;	44	CS
9	9	21	P	33	EN	45	OPTION
10	0	22	:	34	CS	46	SS
11	DE	23	A	35	Z	47	SP
12	Q	24	S	36	X	48	SS

IX.4 CUTTING THE TRACES

We are now ready to cut into the PCB. If you own a Dremel Moto-Tool kit or the like, you'll be done in no time. But otherwise, an X-acto knife with a No.11 blade will do just fine, even if it takes a little longer.

The following list will take you step by step; put the PCB with the 15-pin connector on top, traces of course towards you.

If you're ordered to cut a trace, draw the X-acto knife towards you, taking care not to inadvertently cut adjacent traces. You may find that an additional cut or two may help. Now, move the X-acto blade over about 1/16th of an inch and repeat. Next, gently pry the thusly cut trace away, see Figure 11.

Don't be afraid, there is really nothing to it. And if you find that you cut the wrong trace, don't despair. It is always possible to put a jumper back to where you erroneously cut the trace. But why not try to avoid errors all together?

On Switch 45 (LK), cut BOTH traces close to the solderpads.

On Switch 11 (=), cut BOTTOM trace close to pad, UPPER trace on both sides.

On Switch 32 (;), cut trace close to TOP pad.

On Switch 22 (/), cut TOP trace next to pad, BOTTOM trace ONLY to the right of it!

On Switch 42 (,), cut traces on both sides of BOTTOM pad.

On Switch 43 (.), cut trace to BOTTOM pad. Careful! Don't cut the major trace; just the small portion connecting to the pad!

On Switch 35 (Z), cut BOTTOM trace between it and BOTTOM of 23.

On Switch 36 (X), cut trace close to BOTTOM pad.

On Switch 37 (C), do the same for the BOTTOM pad.

On Switch 38 (V), do the same with the BOTTOM pad.

On Switch 39 (B), cut the trace close to the TOP pad.

On Switch 40 (N), cut trace to BOTTOM pad.

On Switch 41 (M), cut traces on both sides of BOTTOM pad.

On Switch 47 (SP), cut the trace to the LEFT pad.

On Switch 48 (FCFN), cut the traces to BOTH pads.

On Switch 46 (CNTL), cut the traces to BOTH pads.

On Switch 33 (EN), cut the trace to the TOP pad.

On Switch 34 (CS), cut the trace to the TOP pad.

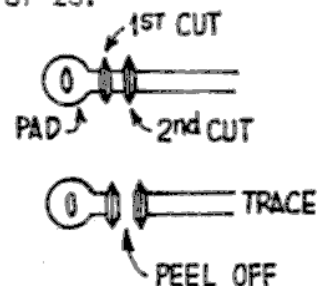


FIGURE 11

This was it, as far as cutting traces is concerned. The next installment will instruct you to make several jumpers and we will also cut into the TS 2068 case!

Note:

---000000000---

© Cedric Bastlaans

The Author is pleased to announce that he has found a way to put the Korean-made SE-JIN keyboard into the TS 2068 case! The Japanese-made ALPS keyboard is STILL to be preferred, though. See the upcoming installments in this Keyboard Mania series...

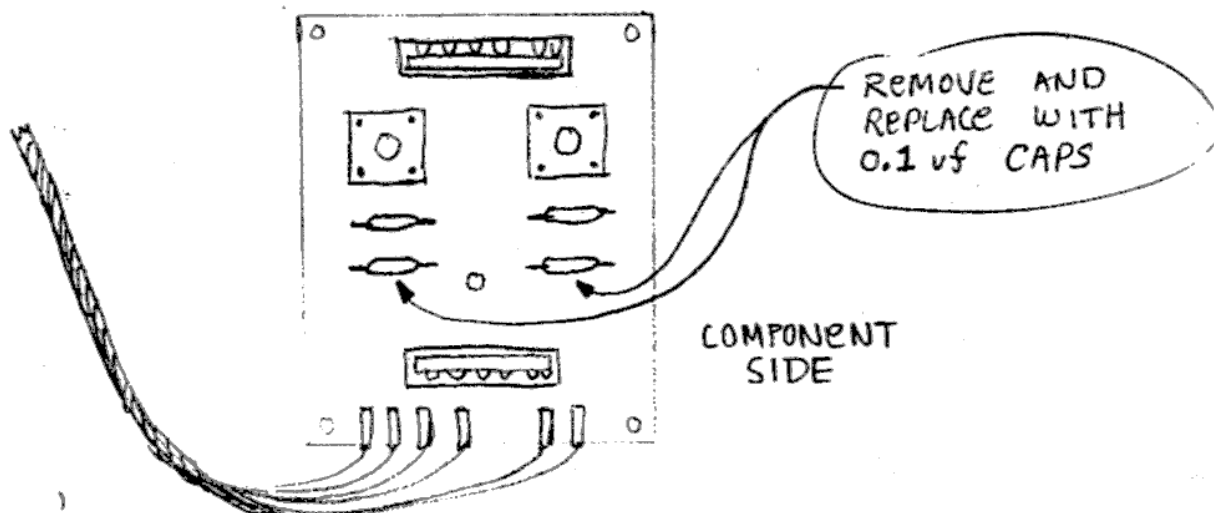
IMPROVING THE ZEBRA GRAPHICS TABLET

Users of the Zebra Graphics Tablet will have no doubt noticed the annoying behavior that I will term "Spray". If you don't press the stylus against the tablet very firmly, you get a wild spray of dots.

You may have also noticed that the "Spray" tends to be directed towards the center of the tablet. This is because there are a pair of centering resistors which cause tablet readings to return to center when there is no contact with the tablet. The "Spray" phenomena is essentially micro separations of stylus contact. The duration of these micro separations is very short but the cursor instantly centers on each separation event, causing the "Spray".

By eliminating the instant centering of the tablet you will be eliminating the "Spray" phenomena. You can do this by removing two resistors and replacing them with 0.1 uf capacitors. To do this follow the instructions below ...

- 1) Place the tablet upside down and remove seven screws.
- 2) Carefully separate bottom of tablet from top. Unplug two connections from the pc board inside.
- 3) Unscrew pc board from bottom of the tablet.
- 4) Desolder the two resistors indicated in the diagram below.



- 5) Solder two 0.1 uf ceramic disc capacitors into the vacated resistor locations.

... put the tablet back together (this may be a bit tricky) and try it out. You will notice a significant improvement in performance.

USING THE LIBRARY TAPE

As there seems to be some confusion on the use of the library tape, we are re-publishing some of the previous descriptions of their origins and use, in this issue. In addition, a detailed explanation of how to use the tape follows:

1. Each member will receive, from time to time, a package containing the following:
 - a) One current library tape, either 60 or 90 minutes long and recorded with a number of programs on each side.
 - b) One "member" tape. This tape starts out blank, but is soon used by members to add their contribution to the library.
 - c) A sheet of mailing labels. Usually these will be from 1 to 6 labels. The last label is for returning the package to LIST after all the other labels have been used.
 - d) A transmittal sheet which you complete to tell us when you received the tape, when you mailed it on, and what you added to the "member" tape.
 - e) Possibly, a list of the programs on the tape.
2. When you receive the package do this:

First, carefully open the envelope. You will be re-using it to mail the tapes to the next member of your group, so please be careful. If you destroy the package it is your responsibility to replace it. Second, remove the contents and make sure they are all there (see list above). If not, please put a note about what is missing into the envelope. Sign and date the note, please. Do not misplace the contents. Now, take the library tape and make a copy. You can either LOAD each program into your computer and then SAVE it to tape, or make an audio copy of the tape. We recommend the second method, as it is much less time consuming. Don't forget to copy both sides. You can use a dubbing deck or two tape recorders and a Radio Shack alternator cord. Do not try to make a copy just by going from deck to deck. It will be an inferior and unreliable copy.

Note that some programs are TS 2068 and some are Spectrum. You will have to figure out which is which. As with cataloging the tape, there is simply not enough time for us to provide all these services on a volunteer basis. By the way, you will often find that TS 2068 and Spectrum programs can be LOADED into (or Merged) and SAVED from ^{the} opposite machine with no problems. Just don't try to RUN the program, in between.

Step

The fourth step is to add your own program to the member tape. Look at the transmittal sheet. Use the information on that sheet to determine where the last member finished adding programs. Cue up the tape to a blank section after the last members program and then add your contributions. You must

supply one program or you will be dropped from the "full participation" groups. Your "program" can be a music or graphic display, utility sub-routine, UDG's, etc. as well as a full blown home, business or game program. (New LIST Logo's are always welcome).

Now, with your program(s) safely added to the member tape, fill in the transmittal sheet. Place the library and member tapes back in their boxes and place the transmittal sheet, the two tapes and any other documents you received, back in the shipping pouch. Do not CLOSE THE POUCH YET.

This is very important! Look at the sheet of stick-on mailing labels. Take the top label on the sheet and place it over the label addressed to you, which is currently on the pouch. Do not use the LIST label unless you are the last recipient. Seal the package and take it down to the post office.

Pay for first class postage to the next member (or LIST, only if you are the last one in your group) and mail the envelope.

Remember

- 1) Do not keep the tape for more than 1 calendar week.
- 2) Do not erase other members programs.
- 3) Do provide your comments about the programs.
- 4) The library tape is not Public Domain, do not share it with others from outside LIST group.
- 5) Send one working programs. You may send non-working programs, too, but you must document the problem. Do this either within the program or on a separate letter.
- 6) Don't send commercial software unless it is your only backup copy (for review) by a LIST staffer or it is a "problem" program. Two such recent examples were Avalon and Rasputin, game programs for the Spectrum. Both use interrupts and caused LOADING problems for the user. Avalon cannot be copied by using IF III and Rasputin will not run, even on a 2068 equipped W/7 pullup resistor. The user was advised to either modify his hardware or return the tapes for credit. Make sure you document the problem- e.g., won't LOAD, LOAD's but quits, etc.
- 7) Follow the principles of LIST programming:
 - a) Main routines at beginning of program
 - b) DATA and information statements at the end.
 - c) Line 9998 should automatically SAVE the program and any bytes files.
 - d) Define variables in the program, preferably in a subroutine near the end, and CLEAR them before SAVING.
 - e) Use REM statements to explain the program. Remember this will be the only documentation users will receive.
 - f) Avoid the use of the TS 2068 "only" commands (RESET, FREE, etc.) where possible. Consider using IN for reading the 2068's joystick ports. If you want to use joy-ports and/or keyboard, consider setting a variable, (by the user), which causes any one I/O method to work. E.G., use a menu to allow selection of other joystick or keyboard. Then use an IF statement before scanning to choose the correct program lines.

Eliminating the 2068 specific commands will allow most programs to run on either machine.

Note in line 0 or 9999 whether the program is TS2068 or Spectrum. Also consider names like:

GAME.TS (a game for TS 2068)
GAME.ZX (a game for Spectrum)

NOTE: YOU MUST READ AND FOLLOW THE ABOVE INSTRUCTION PRECISELY.
FAILURE TO DO SO WILL RESULT IN YOUR REMOVAL FROM FIRST
ROUND PARTICIPATION IN THE TAPE LIBRARY.

COMPUTER DICTIONARY

Specificly - Contraction of specifically

Bear (essentials) - Same as bare in mind (e.g., a picnic basket for Yogi)

Origional - Beginning in a specific region of memory.

Wordproccessed - Text which is prodduced using a Speling Chequer.

Newletter - Additional letters to be used in English language. The 27th letter may be the myackisnak(6).

Rightfull - completely full

Bare in mind - anaked microprocesser.

Experation Date - The date after which you become exasperated, waiting for a mail order.

Charector, (see charectar) a dot-materiX pattern vector.

Survaillance (govenment)-using your computer while on vacation in the Rockies.

Rediculous - the color of your face when you ask a dumb question about computers.

Nucular - of or pertaining to n's (greek letter nu).

Disassembly - what happens when your disassembly of someone else's program starts to look like a disaster.

Revue - rehash of Psion software.

Definetely (interested) - the science or art of defining new meanings for misspelled words.

Ban (as in: let's ban together) a practice of the Boston Computer Society.

TOTALLY SAFE MACHINE CODE FOR THE ZX81 AND TS1000

Rather than starting by beating a dead horse, the answer will precede the explanation.

Here are two templates:

```

1 REM .....1.....2...
0.6.....7.4.....8.5...
0.9.....A.....
2 REM .....1.....2...
0.6.....7.4.....8.5...
0.9.....A.....B.....
/

```

Template #1 provides 112 bytes of machine code space. When more than 112 bytes are needed, template #2 is added. Template #2 provides 122 bytes of machine code space. When still more space is needed, template #2 is copied to line #3 etc., as many times as you like.

Program memory begins at 16509. The following chart shows the memory addresses where the templates are stored. The addresses **** are especially important. Your machine code can be POKED into the text area of any template, with one (but important) restriction.

NOWHERE in your machine code can CHR\$(116)="ENTER" appear! The computer will interpret it as the end of the REM statement, with disastrous results.

FORMAT	1 REM	2 REM	3 REM	4 REM	5 REM	...
155 LINE #	16509	16627	16755	16883	17011	...
156 LINE #	16510	16628	16756	16884	17012	...
155 LENGTH-4	16511	16629	16757	16885	17013	...
156 LENGTH-4	16512	16630	16758	16886	17014	...
CHR\$(234)="REM"	16513	16631	16759	16887	17015	...
START OF TEXT	16514	16632	16760	16888	17016	...
END OF TEXT	16525	16753	16881	17009	17137	...
CHR\$(116)="ENTER"	16626	16754	16882	17010	17138	...
TEXT BYTES	112	122	122	122	122	...

Avoiding CHR\$(116) in your machine code is always possible, but here are sneaky ways it can get there without you being aware of it. Either byte of a two byte CALL or JP address might accidentally be CHR\$(116). The first sneaky addresses in RAM are: 16502, 16756, 17014, 17270, etc. by increments of 256 bytes.

Ah hah! The templates hide these under *****, so you do not have to worry about them. Don't stop worrying yet, though.

There are two more cases which require caution.

The first is another sneaky one, but simple to avoid. Never use JR __,+120. Use JR __,+121 and add a NOP instead.

The other case is obvious, but harder to fix. LD __,116 and CP 116 cannot be used.

For LD __,116, use LD __,117: INC __.
For CP 116, use CPL: CP 37: CPL __.

In brief, never use:

```

JR __,+120,
LD __,116, or
CP 116.

```

The result is perfectly safe machine code which can be edited, added to, and saved to tape. (All right, you experts; you can't use I/O device (N)=116, and you better use (HL) when addressing ROM routines.)

HEY! It works! Forget that dead horse.

The wierd doodad at the end of the templates is simply three NOPs followed by JR +6. It comes in handy when your code runs into the next template.

One last hint--keep a spare copy of both templates.

LIST

LIST PRINTER INFORMATION

PARALLEL - SERIAL INTERFACES:

SERIAL INTERFACES send information to the printer one bit (0 or 1) at a time, one right after the other.

PARALLEL INTERFACES send information to the printer eight bits (one byte) at a time.

You can't connect a parallel interface to a serial printer, or vice versa. No damage will result - it just will not work!

SERIAL is also referred to as RS232.

PARALLEL is also referred to as CENTRONICS.

DOT MATRIX - DAISY WHEEL:

DAISY WHEEL PRINTERS provide LETTER QUALITY printing, equal to, if not better than an electric typewriter.

The term "DAISY WHEEL" relates to the print wheel which has "petal-like" elements which stem from its hub. The individual characters are embossed on the petal ends and when activated, will print those characters on paper.

DOT MATRIX PRINTERS:

The DOT MATRIX process is an ingenious method of forming the character a column at a time on the print head and transferring it to paper. The print head has a set of electronically activated thin rods (needles) arranged in a vertical column. On the PROWRITER 8518 printer, characters are built on either a 8 x 8 or 7 x 9 matrix, much the same way that characters are built up on a CRT tube.

As the printer carriage moves horizontally, the needles needed for that matrix column are fired. With a five-column matrix the needles must fire five times to create a character.

PRINTING SPEEDS:

DAISY WHEEL printers usually print between 10 and 30 CPS.

DOT MATRIX printers usually print between 80 and 180 CPS.

CPS = CHARACTERS PER SECOND.

Printing speeds vary from one printer to another. DAISY WHEEL printers are relatively slow as compared to the DOT MATRIX printers. However the letter quality print more than justifies the slower printing speed.

ASCII CHARACTER AND CONTROL CODES:

One thing that all 80 column printers seem to have in common is that they use the standard ASCII codes for control code commands to instruct the printer to do something; like change fonts, change from the normal print mode to a graphics mode.

Codes 8 to 32 are unprintable characters and are used as printer commands such as line feed and carriage return.

Codes 33 to 127 (and beyond) are the standard character codes as we are used to and are also used by printers as control codes to underline characters, back space to slash a zero or to change from pica pitch to elite pitch or to double strike characters to print bold.

If you intend to program your printer without using a word processor such as TASWORD II or MSCRIPIT, then there will be several ASCII codes you will become familiar with:

ESC - ESCAPE CHR# 27 - This command is the kingpin of all printer codes. Escape advises the printer that a control code is about to follow.

CR - CARRIAGE RETURN CHR# 13 - This code commands the printer to return to the left most position after printing a line of text.

LF - LINE FEED CHR# 10 - This code commands the printer to rotate the platen which will move the paper up one line.

Your printer user manual has charts indicating which codes are used as control commands and their respective functions.

Learning to use these commands takes time and patience and I personally feel that it is easier to program your printer from a word processor such as TASWORD II and MSCRIPIT which provide the means with which to activate the hidden functions in your printer. This method is called embedding control codes by using graphic characters or using a graphics format line.

PRINTER SWITCHES:

Most printers have one or more banks of DIP switches for the printer operator to set printer functions instead of using ASCII control characters to program the printer to do the same thing.

Some switches select character sets, provide a slashed zero, change character pitch or perform a line feed and change bidirectional printing to unidirectional printing.

Switches are placed in an accessible location for the operator to activate.

PRINTER PAPER:

Most printers can handle either or a combination of the following paper types:

FAN FOLD - Sprocket feed, clean perf paper or forms.

SINGLE SHEET - Common 9 x 11, 9 x 14, or letter head.

ROLL PAPER - Pulp variety as used for TELEX machines.

I use roll paper for all my rough drafts then switch to either fan fold or single sheet paper for a final copy.

CARRIAGE SIZE: 10 inch to 15 inch

This depends on YOUR requirements. If you intend to print out spread sheets, then the 15 inch carriage should be considered before you purchase a printer, otherwise a 10 inch carriage should be adequate.

TIMEX COMMANDS:

LPRINT and LLIST - All printers respond to these commands.

COPY - Most EPSON and EPSON COMPATABLE printers and OLIVETTI printers will respond to a COPY command from the keyboard.

NOISE:

Large printers are noisy! Some make more noise than others. This should not turn you off towards using a printer. Placing your printer on a foam pad will absorb lots of noise and if it really bothers you, enclose the printer within an acoustical enclosure.

COMMERCIAL PRINTER INTERFACES AND PRINTER DRIVER SOFTWARE.

PARALLEL INTERFACE	PRINTER DRIVER SOFTWARE LOCATION
AERCO	HIGH MEMORY
OLIGER	PRINTER BUFFER
TASMIN B	HIGH MEMORY
ZPRINT-80	HIGH AND LOW MEMORY
for SPECTRUM I use:	
AERCO	HIGH MEMORY
KEMPSTON E	EPROM
SERIAL INTERFACE	
BYTE-BACK	have no information at hand

PIN DOT GRAPHICS - PROWRITER

#####

```
5 POKE 64256,0
6 LPRINT "PIN DOT GRAPHICS - PROWRITER"
7 LPRINT CHR$(13);CHR$(10);
8 LPRINT CHR$(13);CHR$(10);
10 FOR x=1 TO 60
20 LPRINT CHR$(27);CHR$(83);"0010";
30 FOR i=1 TO 10
40 READ B: LPRINT CHR$(B);
50 NEXT i
60 RESTORE
70 NEXT x
80 LPRINT
90 DATA 64,64,64,127,115,115,127,64,64,8
100 POKE 64256,1
105 LPRINT CHR$(13);CHR$(10);
106 LPRINT CHR$(13);CHR$(10);
110 LLIST
```

PIN DOT GRAPHICS 2 - PROWRITER

#####

90 DATA 96,96,96,96,127,127,3,3,127,127

[illegible]

THE TAB SET
678901234567890123456789012

A	E	C
F	B	D

MODE

TO MSRIPT FOR PROWITER
ON/OFF

re any of following commands

DERLINE ON/OFF

to ten (10) special print
format lines

... and so on....

giving it a printer command
a code that will follow
could be any number from
0 to 255. The decimal value
of the character "1" tells MS-
cript what printer to use.
and MS-cript will ignore the

Robert Gilder

Robert Gilder

THE TSD SET
 6789012345678901234567890123456789012

A	E	C
F	B	D

MODE
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 101

Robert Gilder

[illegible]

Robert Gilder

[illegible]

```

1 POKE 44256,0: LPRINT CHR$ (
27);CHR$ (78);THIS IS PICA PIT
CH...Pica pitch"
2 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
3 LPRINT CHR$ (27);CHR$ (69);
THIS IS ELETE PITCH...Elete p
itch"
4 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
5 LPRINT CHR$ (27);CHR$ (81);
THIS IS COMPRESSED TYPE...Com
pressed type"
6 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
7 LPRINT CHR$ (27);CHR$ (80);
PROPORTIONAL SPACING BETWEEN C
HARACTERS....Proportional spac
ing"
8 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
9 LPRINT CHR$ (14);"ELONGATED
TYPE IS QUITE USEFUL....Elonga
ted"
10 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
11 LPRINT CHR$ (15);
12 LPRINT CHR$ (27);CHR$ (33);
THIS IS BOLDFACE TYPE....Boldf
ace"
13 LPRINT CHR$ (27);CHR$ (34);
14 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
15 LPRINT CHR$ (27);CHR$ (88);
"SEE--IT REALLY IS UNDERLINED!"
16 LPRINT CHR$ (27);CHR$ (89);
17 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
18 LPRINT CHR$ (27);CHR$ (82);
"100%!"
19 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
22 LPRINT CHR$ (27);CHR$ (35);
23 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
24 FOR I=27 TO 92
25 LPRINT CHR$ (1);
26 NEXT I
28 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
30 LPRINT CHR$ (27);CHR$ (38);
31 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
32 FOR I=27 TO 95
33 LPRINT CHR$ (1);
34 NEXT I
35 LPRINT CHR$ (13);CHR$ (10);
CHR$ 10;
36 LPRINT CHR$ (27);CHR$ (36);
48 STOP

```

TASWORD II CUSTOMIZED GRAPHICS

C/S KEY	ASCII	PRINTER 8510	ASCII	KEY
1	14	ELONGATED TYPE	15	1
2	33	BOLDFACE TYPE	34	2
3	88	UNDERLINE TEXT	89	3
4	78	PICA PITCH	.....	4
5	81	ELITE PITCH	69	5
6	91	COMPRESSED	.....	6
7	35	PROPORTIONAL	88	7
8	93	INCREMENTAL	.....	8
		BACKSPACE	88	9
		PRINT GRAPHICS	.....	10
		ALPHANUMERICS	36	11
		LOGIC SEEKING	.....	12
		UNASSIGNED	.....	13

TASWORD TWO CUSTOMIZED GRAPHICS

SILVER-REED EXP400

PRINTER CODE & FUNCTION	ASCII	KEY
27,30,9 LINE FEED CHANGE	128	8
27,79 BOLD PRINT ON	129	1
27,69 UNDERLINE ON	130	2
27,68 SUPER SCRIPT ON	131	3
27,85 SUB SCRIPT ON	132	4
27,31,15 HORIZ PITCH ON	133	5
27,3 GRAPHICS ON	134	6
8,47 BACK SPACE - Ø	135	7
27,13,80 RESET PRINTER	136	C/S 7
27,4 GRAPHICS OFF	137	C/S 6
27,31,12 HORIZ PITCH OFF	138	C/S 5
27,68 SUB SCRIPT OFF	139	C/S 4
27,85 SUPER SCRIPT OFF	140	C/S 3
27,82 UNDERLINE OFF	141	C/S 2
27,38 BOLD PRINT OFF	142	C/S 1
27,30,9 LINE FEED NORMAL	143	C/S 8

LIST group

FOR SALE: one Perco 2068
centronics printer interface -
new with software and
documentation. Not used

Asking \$55 US or \$75
Canadian. Includes shipping

MR. RONALD JAMES
615 BODINE ST. TORONTO, ONTARIO, CANADA M6H-2M6

welcome back. The first installment might have given you the idea that knowing machine code was necessary for understanding bank switching. Would I do that to you? On occasion, machine code will be presented to support "fixes", but if you don't actually make the fixes you can skip it without any loss. CLOSE #3 we previously discussed how to fix a statement line. CLOSE #3 when new devices had been added. "C" for a CENTRONIX printer is a typical example. The OPEN statement pulls an error which can be trapped with ON ERR. Fixing this type of problem is quite simple. The error number and location are available in the system variables.

OPEN #3, "C" is sufficient syntax if patches have been made to the CHANS table, or a new channel has been inserted. The complete syntax for OPEN goes beyond this. The statement for an EXBU floppy disc drive, bearing a BEU chip is:

OPEN #77'D', (parameter list)

The parameter list includes such information as drive number, disc label, filename, extension, disc format standard, and file attributes. This syntax is common to all bus expansion units.

Different devices require different parameters, of course. Does this give you the idea that you can read, say, an IBM formatted disc? Yup, but it won't be easy until the interface routines become available.

What an OPEN statement does is to verify the presence of the device, then post the offset to STRMS pointing to either CHANS or SYSCON as appropriate. In the process, a device-dependent OPEN routine is generally required--just as for CLOSE.

The key here is "the presence of the device". That is where bank switching begins.

When you turn your computer on, it goes through a lengthy initialization process to make it possible to do all those wondrous things. Just before the copyright message appears, the bank switching system is invoked to search out and identify what is connected, and to prepare a sorted list of them. That list is the system configuration table (SYSCON).

And there is more to this bank switching than you thought! Cartridges which plug into the dock have reserved places at the bottom of SYSCON; one for ARDS and one for LRDS types.

Does it make more sense now, that this article began with I/O? It was necessary to put in perspective what bank switching does, before showing how it works, explore how it works, but in the interest of fairness, a short description is in order.

The bank switching controller (BSC) resides in the SCLD. It can be reached directly through the I/O system and indirectly by issuing orders to MACROS in the SCLD. The indirect route uses memory mapped I/O and "doublets" which is almost magical. The SCLD MACROS issue lots of instructions to the BSC for each order received, so it pays to use them. They also perform other tasks involving the CPU.

The bank switching system has a separate data bus all its own. This consists of four lines from the JOYSTICK port (which transfer "nibbles") for data, and one line which steers the data to a LSN or RSN register. Data is transferred a byte at a time, taking two cycles per transfer. While doing this, the SCLD turns off the CPU clock, leaving the CPU frozen in time with all its signals maintained, active or passive.

This solves the problem of being interrupted. The SCLD takes over most of the computer. When the MACRO task is complete, the clock starts running again without the CPU being aware that the lapse has occurred.

Bank switching control lines include D2OUT, D2IN, and BUSISD. Though CPU lines are "frozen", the address lines A13 to A18 can be borrowed and used as function selectors. Anyone interested in learning more about peripheral control systems can find the IEEE 488 standard in their libraries or in the INTEL manual.

None of the control lines are connected in the T2065. We'll cross that bridge when we come to it. For now, we'll assume all signals are available.

Every BEU has an Identification Number (ID) which it recognizes when it appears on the bank switching data bus. It responds by sending D2IN. No two devices can have the same ID and zero is not allowed. The BSC polls from 1 to 255, stopping when D2IN is sensed. In this way it finds all attached devices, one at a time. It returns control to the CPU each time.

The CPU tests the bank for being RAM or ROM and creates an entry for it in the SYSCON table. All RAM is treated alike, but ROM is prepared for sorting. Before going on, the BEU is told to recognize its position in the SYSCON table instead of its ID.

The XPER BYTES routine in chunk 3 lets the CPU get data from chunk 8 of the bank into the SYSCON table, using bank switching of course. Only one byte is needed to test if it is RAM. For ROM, the first 22 bytes are copied into SYSCON. If the device is not an EXBU, these bytes (and others perhaps) belong to the BEU chip. The data is used for initialization, but the device is never bank switched. This is the case with most printers and the better implementations of DOS systems.

Those first 22 bytes of ROM carry all the information needed to identify and operate the device. Some devices are not ROM, requiring additional testing to identify them.

Once the table is complete, and all BEU's are recognizing the new assigned bank numbers (BSN), it is sorted according to the priority read in byte 22. Lower numbers mean higher priority to be placed near the bottom of the SYSCON table. RAM is given a priority of 255 so it is always above any ROM entries. Devices which have handling routines in the HOME ROM are at the bottom. NonEXBU devices come next, then EXBUS. It was planned to accommodate thirteen different devices, but which has not been said. RAM banks are loaded with the interrupt handler from the EXROM.

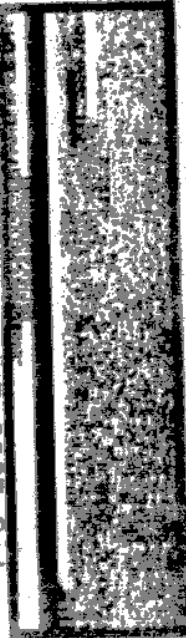
The last phase of initialization is the posting of nonEXBUS to CHANS and posting that fact back to SYSCON.

THEN--the copyright notice appears.

Next we will look a lot more closely at that SCLD, examining its power and limitations, but not now. Yes, the system will be summarized, but not until the final article in the series.

Complicated isn't it? Like life, it's "verrrrry interesting."

© 1985 William J. Pedersen



ATARI KEY PAD

NOTE: We mentioned last month that you could get one of these 12 button pads, which are similar in profile to the TS2068, for \$50 at local Odd-Lot stores (as part of the Star Raiders package for the ATARI 2600 or VCS). Experimentation has since shown that pin 8 is not connected. This pin is the STB line on the 2068's left and right joystick and is the essential line required by STICK. As such, the pad cannot be used directly with a 2068. Modifications to the 2068 and/or replacement of the pad cord are required if you intend to use the pad. Further, unless you're willing to do some sophisticated rerouting and I/O software development, it is unlikely that more than 10 of the buttons can be effectively used. We'll be publishing a detailed "Hackers Notebook" item on this unit next month. At 50¢ we still think the STAR RAIDERS package is a good source for experimenters parts.

HACKERS NOTEBOOK

ATARI KEY PAD (STAR RAIDERS)

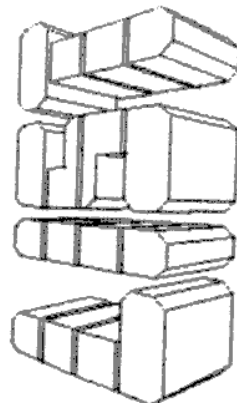
The attached page one gives the schematic for the ATARI key pad and 2068 joystick (a fairly standard joystick configuration). Note that line 8, STB, is the one key pin missing from the key pads plug. This makes the pad useless as a simple input device. Still, there are several inexpensive ways around this problem. Some of these will be illustrated here and others, requiring somewhat more advanced skills, will be suggested.

A glance at page 1 of 2 shows that the standard ATARI or TS 2068 joystick uses 5 data lines and one strobe to send data into the computer. The strobe line on some machines is simply ground or +5V on many machines, the important thing to remember is that it is the "common" connector. Crossing any one of the 5 data lines (up, down, left, right, fire) with the common, or strobe, line pulls that line low (on our machine, STB is an active low line). The input/output (I/O) port in the 2068 reads the 5 data lines and latches the bit pattern of D₀, D₁, D₂ (directions) and D₃ (fire) into the Program-able Sound Generator (PSG) chip. The STICK command reads the I/O ports in the chip, manipulates the data slightly, and returns a value (2, 4, 8 or 12 for the 4 compass points) to the BASIC for your program to use. STB is actually a different line on each joystick. The left is A8 (address line #8), the right, A9.

STICK is thus a sophisticated IN routine. Compare the use of STICK and IN in the attached joystick test program. If you type this in, you'll find that STICK is somewhat faster. This is because the IN lines must each be interpreted by BASIC, one at a time. STICK does the equivalent of several functions at once. The trade-off for this sophistication is a loss of speed, as you've seen, and flexibility. IN reads all 5 data lines and reports the results as a single Byte (e.g., 128= FIRE, 129= FIRE & UP)

Since STB isn't connected on the ATARI key pad, we need some other way to read which switches are closed. A look through the 2068 tech manual tells us that all the data lines are latched high on start up. When resistor 14 of the PSG is read (for STICK, or certain IN addresses) the appropriate STB line is brought low. If the joystick is activated, a data line contact is made with STB, and the appropriate data (DN) line is brought low. The ROM software reads this and passes a parameter to BASIC, which is then used by your program.

We can make a data line go low just as easily by grounding it. Again, however, there are trade-offs and problems. By using ground we've lost our ability to tell which (left or right) joystick is responding. (E.g., if A8 is low and the right fire button is pushed a normal STICK command will not read it). Still, if we only need to monitor one joystick (5 data inputs), this will suffice. We tried this and nothing happened.



It appears that in most 2068's, the joystick port ground line is not connected. In order to use the ATARI key pad, we had to connect the ground line on our joystick port. This is a fairly simple procedure, involving soldering a short piece of wire from pin 9 to a nearby ground. For the left joystick, the negative side of the nearby Electrolytic capacitor works fine. Be very careful when soldering to the joystick legs, however. These are two unconnected pins in the inner row of four, you want the one closest to the front of the machine. We found it easier to remove the whole circuit board to do this job, as you must work around the outer row of 5 pins. Be careful not to short any lines together.

The ATARI pad, as can be seen from page 1 of 2, uses a 3 X 4 (3 columns by 4 rows) matrix to read the twelve touch pads. Our simple ground = STB setup gives us a potential 1 X 5 array. If we don't modify the circuit traces of the key pad (see pg. 2 of 2), the least we can do is read the 4 row inputs in one column or the 3 columns for 1 row. The later is practical for many platform games; where left, right and jump are the only moves required. Page 2 of 2 shows how the internal clip-on ends of the ATARI keypad were changed in order for us to read row 3's 3 buttons as left, fire and right (reading from L to R). Depending on the software, this setup should work with commercial programs which use one joystick, as well as it does in our BASIC test program. The new configuration of the port, of course, ignores whatever the software is trying to do with A8 and A9 and simply reads that the data line is grounded. We've lost port selection and some more esoteric features like software debounces, but these may not be a problem in your application. Note that this modified pad will only work on a port with pin 9 grounded. Do not try to use the modified pad on an ATARI or Spectrum joystick interface. At best, it will not respond, at worst it could short out the machine. Finally note that the keypad has 2 - 4700 Ω pullup (down ?) resistors crossing two of the column lines. One end of each of these must be unsoldered or cut. The keypad modifications are shown on page 2 of 2.

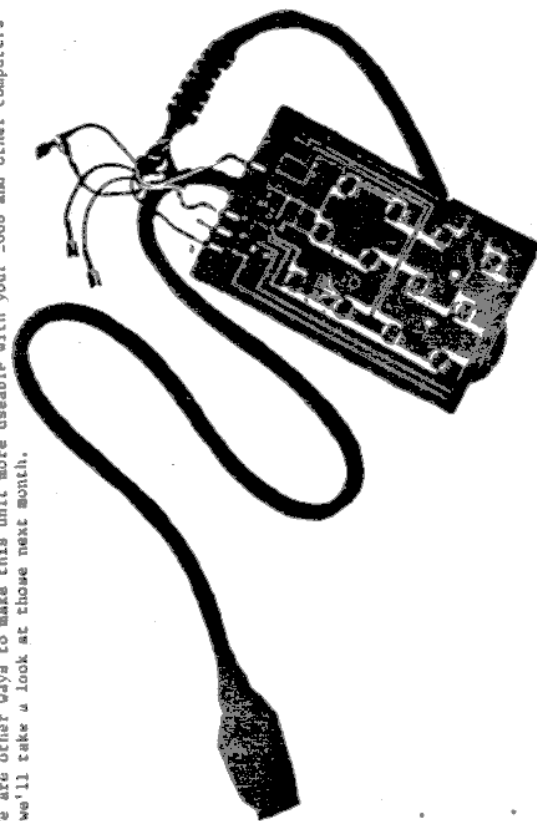
ADVANCED TOPICS

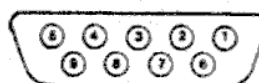
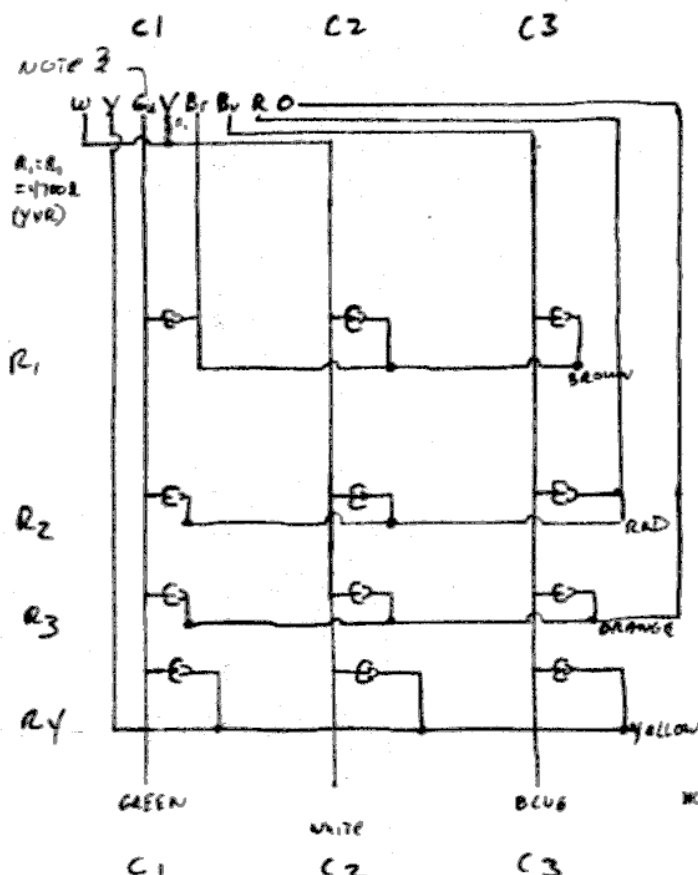
Since there are two X 5 lines, or 10 data lines, on the PSU, it is possible to rewire the 2068 and keypad to scan 10 of the buttons. This would provide a handy numeric keypad (using STICK), for the digits 0 then 9. We need, of course to hook up strobe and this where the incomplete wiring of the 2068 may actually help us. On the left joystick port we connected ground where it should be to use a single row of the keypad. We could modify the right side port, which is used less frequently, to read all 5 data lines on either joystick.

This can be accomplished as follows: (not tested)

Connect a jumper from A8 on the left port to pin 5 of the right port. Connect a jumper from A9 on the right port to pin 9 on the right port. This should not effect operation of a normal 6 wire joystick (U,D,L,R, Fire and ground wire only-check the plug). It does, however, provide both the A8 and A9 Strobes to pins which the ATARI key pad can read. You must also modify the foil pattern of the key pad circuit board to match a 2 X 5 matrix. This involves cutting some traces and adding a few jumpers. Write interrupt drivers software, following the example in the tech manual which scans your new key pad automatically. Spray paint the pad silver if you have a 2068, and add bigger rubber feet to match the 2068's slope and you've got a sophisticated "dedicated numeric keypad".

There are other ways to make this unit more useable with your 2068 and other computers and we'll take a look at those next month.



Subject ATARI TOUCH PAD + TIMEX JOYSTICK
ORIGINAL MATRICESATARI PAD
PLUG

PIN

JOYSTICK PLUG
(TYP)

ATARI PAD	PLUG	PIN	JOYSTICK PLUG (TYP)	2068
R1	BR	1	U	D3
R2	RL	2	D	D2
R3	OR	3	L	D1
R4	YL	4	R	D0
C1	GN	5	M/C	-
C3	BU	6	FI	D7
+	VI	7	-	+5?
M/C	M/C	8	STB	STB
C2	WH	9	-	1?

NOTES:

- Power &/or Ground may not be connected on your machine. Grounding in particular may not be connected.
- The absence of a connection on pin 8 of the Atari touch pad makes it unsuitable for use with the TS 2068 joystick ports (or as a joystick, per se, for any Atari compatible).
- Removal of pullup resistors is probably required.

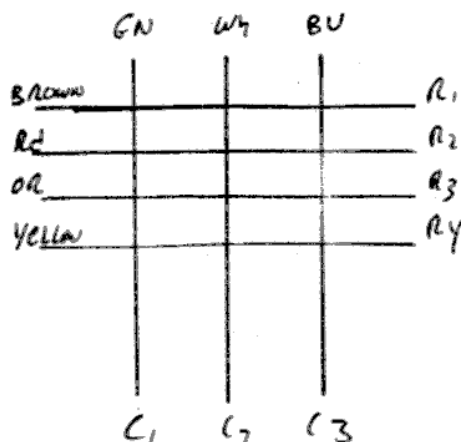


TABLE 2.0.1-1

JOYSTICK CONNECTOR SIGNAL ASSIGNMENT

PIN	SIGNAL NAME	I/O PORT BIT	FUNCTION
1	STICK UP	0	STICK UP
2	STICK DOWN	1	STICK DOWN
3	STICK LEFT	2	STICK LEFT
4	STICK RIGHT	3	STICK RIGHT
5	---	---	NOT USED
6	BUTTON	7	PUSH BUTTON
7	5V	---	5 VOLT POWER
8	HEAD STROKE	---	ADDRESS BIT 0 OR 1*
9	---	---	POWER GROUND

*When Address Bit 0 is high, the Head stroke is the left joystick. When Address Bit 0 is low, the Head stroke is the right joystick. In either case, the Head stroke is always low.



Engineering Chart Sheets

App. _____

Subject ATARI TOUCH PAD - MODIFICATION #1
LEFT/RIGHT & FIRE (jump)

Date _____

By 2/4/86USE LEFT JOY PORT ON
TS2068

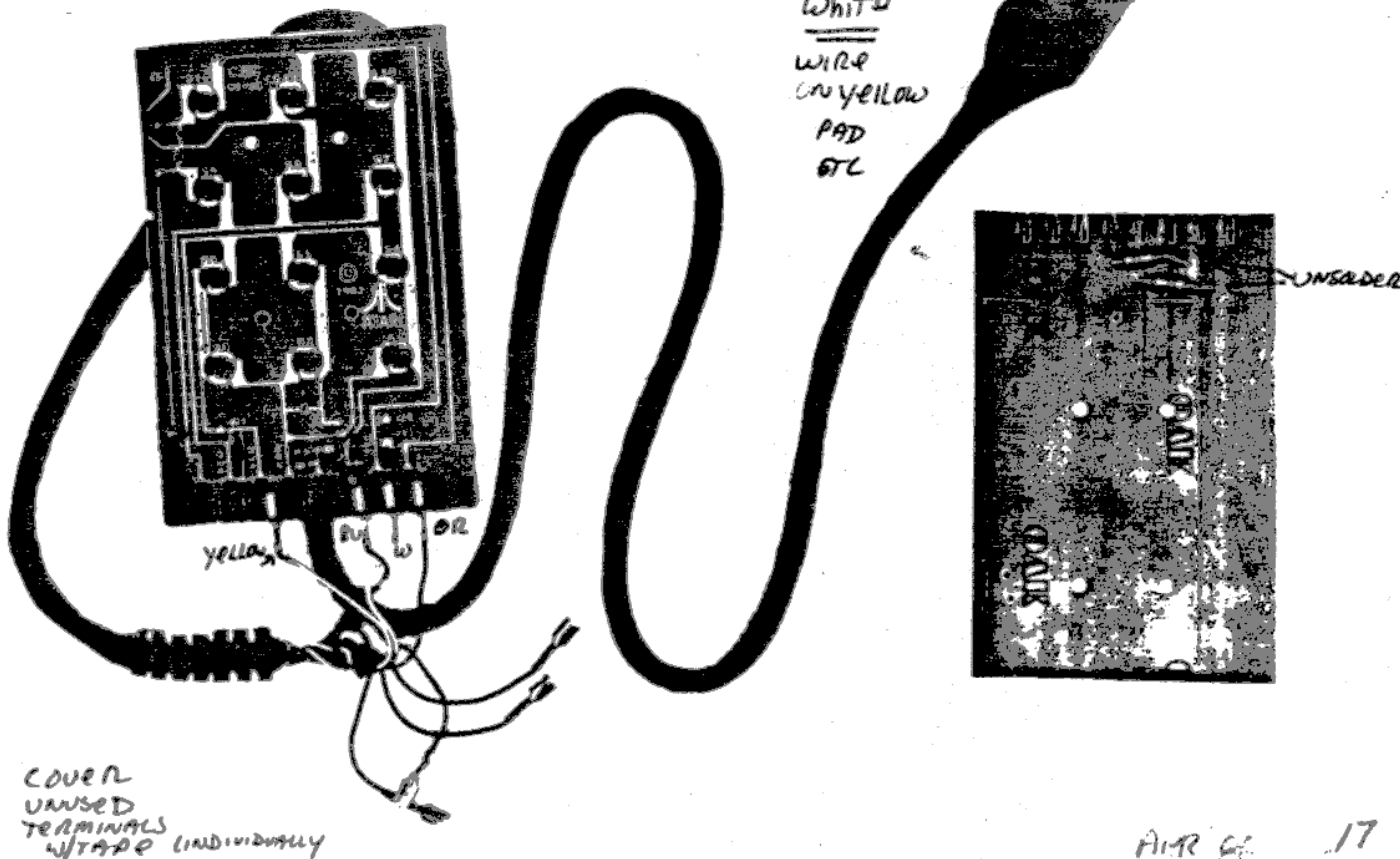
```

10 FOR I=1 TO 700
20 PRINT STICK (1,1)
30 NEXT I
80 STOP
90 FOR I=1 TO 700
100 OUT 245,14
110 LET S=255-IN 245
120 PRINT S
130 NEXT I
200 OUT 245,14: OUT 246,255
299 STOP
300 FOR I=1 TO 200
310 IF STICK (1,1)=4 THEN PRINT
    "Left"
320 IF STICK (1,1)=8 THEN PRINT
    TAB 20; "Right"
330 IF STICK (2,1)=1 THEN PRINT
    TAB 10; "FIRE"
360 NEXT I

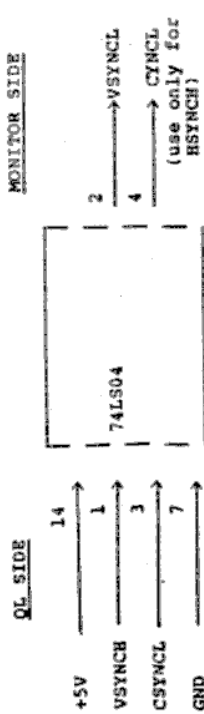
```

} NORMAL STICK - PAD WILL GIVE
4=L; 8=R

} INPUT FIRE=128; 4=L; 8=R

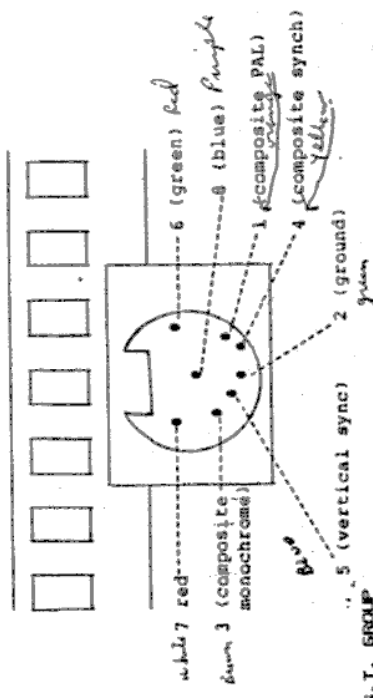
PAD WILL PRINT
LEFT, RIGHT OR FIRE
FOR BOTTOM ROW.NOTE { YOU MUST CONNECT GROUND TO
PIN #9 INSIDE THE 2068

The Sync signals vary from monitor to monitor. Usually, monitors which ask for Horizontal Sync will accept Composite Sync, so it is merely necessary to invert the Sync signals if they are of different polarities to those provided by the QL (this is sometimes required for both syncs, sometimes for one, and sometimes on the other). On U.S. QL's where the +5V signal is provided on the DIN connector, this can be done with a signal IC: the easiest is a 74LS04, but many other IC's can be used with appropriate adjustment to the pin-out.



Pin	Function	Signal	Wire Color	Signal Level
1	PAL composite PAL	orange	1V pk-pk into 75 ohms	
2	GND	green		
3	VIDE composite monochrome video	brown	1V pk-pk into 75 ohms	
4	CSYN composite sync	yellow	0-5V TTL (active low)	
5	VSYN vertical sync	blue	0-5V TTL (active high)	
6	GREE green	red	0-5V TTL (active high)	
7	RED red	white	0-5V TTL (active high)	
8	BLUE blue	purple	0-5V TTL (active high)	

Diagram of Monitor Connector as Viewed from Rear of QL. Showing pin number and functions:



L.I.S.T. GROUP
P.O. BOX 438
Centerport, N.Y. 11721-0438

Dear L.I.S.T.:

Thanks for including me on the Library tape mail list. I was pleasantly surprised when I received it. I now have increased my system; TS2068, ZEBRA DDS & 2 DD, STAR SE-10 Printer, 2050 Modem, Tassan I/F, and NOW the QL and an RGB monitor. I need some help with the RGB connecting cable to a

Model # C6552.

TECHNICAL SPECIFICATIONS

Picture Tube Type	13 diagonally measured
Deflection Angle	90
Video Input Signal	Composite Video 1VP: negative TTL level digital video, separate sync, phono connection type
Horizontal Resolution	390 dots (RGB)
Character Field	25 lines of 80 characters (2000 inter)
Audio Input Level	Up to 150mV phono connector type
Audio Output Level	Up to 1W @ 5% distortion
Power Supply	120Vac ± 10%, 50-60Hz
Power Consumption	75 Watts Maximum
Dimensions (H x W x D)	320 x 350 x 387mm

In support of our policy of continuous product improvement, the above specifications are subject to change without notice.

SAFETY PRECAUTIONS

- Do not place objects on top of the monitor cabinet which could fall into vents or which could cover them and prevent proper cooling of the monitor's electronics.
- To reduce the risk of fire or shock, never expose the monitor to rain or excessive moisture.
- Do not place your monitor where sunlight or bright room light will fall directly on the screen.
- When necessary, clean the cabinet with a damp cloth. Use only mild detergents. Do not use alcohol or ammonia based products.
- Unplug the AC cord from the outlet if the monitor is not to be used for an extended period of time.

User Maintenance Caution

There are no user serviceable parts inside the monitor's cabinet. Do not attempt to remove the cabinet back as you will be exposed to a shock hazard.

This monitor generates and uses radio frequency energy and it not installed and used properly may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If it does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- relocate the computer with respect to the receiver
- move the computer away from the receiver
- plugging the computer into a different outlet so that the computer and receiver are on different circuits

If necessary, the user should consult the dealer or an experienced television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems." This booklet is available from the US Government Printing Office, Washington, D.C. 20540 Stock No. 040-000-00345-4



When using this socket for connecting the equipment, place the RGB/Composite Switch in the RGB position.

PIN ASSIGNMENTS

PIN NO.	TTL INPUT	8 PIN SIGNAL
1	not connected	
2	Red	
3	Green	
4	Blue	
5	Intensity	
6	Ground	
7	Horiz Sync	
8	Vert Sync	

QL is (RED, GREEN, BLUE, VERT, SYNC, VERT, SYNC, VERT, SYNC). I followed the directions in the QL fact sheets sent with the QL, that is the HORIZ. SYNC. on the monitor would accept the COMPOSITE SYNC from the QL. This left the COMPOSITE MONOCHROME and COMPOSITE PAL and I could not decide which should go to the monitor pin 5-INTENSITY or pin 1-NOT connected. When plugged in all I got was a constant vertical roll but when the COMPOS. MONO. was connected to the 3 pin and the HORIZ. SYNC. or VERT. SYNC. I got a VERT. roll that would stop for a min. or two then start

Sincerely

William P. Allen
P.O. Box 325
Islip Terrace, N.Y. 11752

151

L.I.S.T. GROUP
ROBERT GILDER
69 Jefferson Place,
Massapequa, N. Y. 11758
February 16, 1986

Mr. William P. Allen
P. O. Box 325
Islip Terrace, N. Y. 11752

Dear Bill;

I read your letter to LIST and will attempt to help you sync your QL computer with your Magnavox RGB monitor.

Specs from a European QL indicate that the QL provides positive vertical syncs and negative composite/horizontal syncs.

From the technical specifications you included with your letter for the Magnavox monitor, composite video requires negative syncs, but no mention of polarity for horizontal and vertical syncs. It also appears that your hookup from the QL to the monitor is correct which leaves me to believe that one or both sync inputs to the monitor may require inversion, especially since an inverter circuit was provided with the QL.

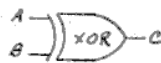
I have enclosed a circuit which I use often for sync polarity inversion; using a 74LS86 quad EXCLUSIVE OR gate. The only difficulty you may have is to provide the IC with +5 VDC operating voltage. The fact sheet for the QL which you supplied us with states that on US version of the QL +5 VDC is available at the DIN connector. I am assuming that your QL is European with PAL composite video because pin one of the DIN connector indicates PAL. You may be able to "steal" 5 volts from your monitor or a small regulated power supply can be built to power an inverter circuit.

The Sinclair circuit using a 74LS84 Hex Inverter has been redrawn to simplify the circuit assembly.

Either circuit should provide you with proper inversion of one or more sync signals, however the 74LS86 circuit which requires an addition of 4-1K resistors will allow you to change sync polarity while the computer and monitor are operating.

As a point of interest, the following TRUTH TABLE for the 74LS86 XOR IC will provide an insight to how the IC performs inversion.

A	B	C
1	1	0
1	0	1
0	1	1
0	0	0



Note: A & B are inputs, C is the output.
1 is a logic high, 0 is logic low.

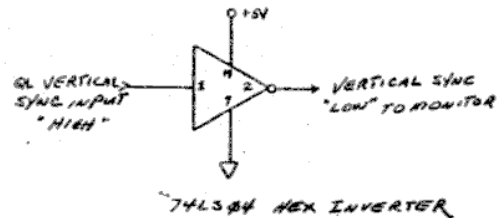
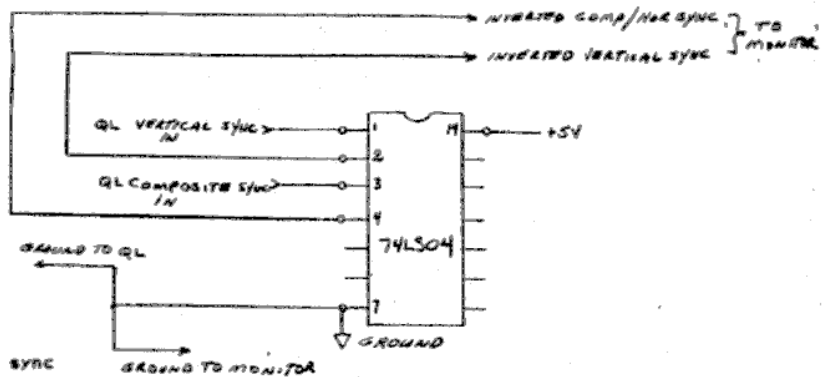
If inputs A and B are either at a logic high or low (1 or 0) then the output from the gate is low (0). If either input A or B is high and the other input is low, then the output will be high (1).

The schematic will indicate that both gate inputs for each gate used are held at logic high with 2-1K resistors. Signal inputs will appear on IC pins 2 and 12. If your computer and monitor are operating and the image is rolling, simply placing IC pin(s) 1 and/or 13 at ground potential using a short section of hook up wire will invert the signal to your monitor. When the right combination of polarity is found, solder a jumper from the gate input to ground.

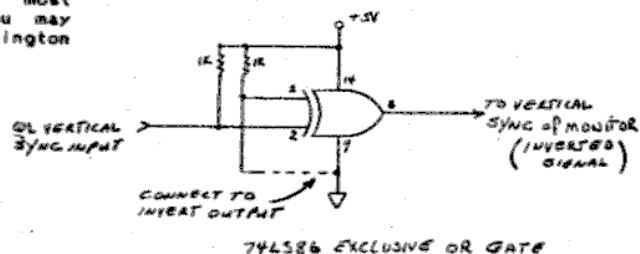
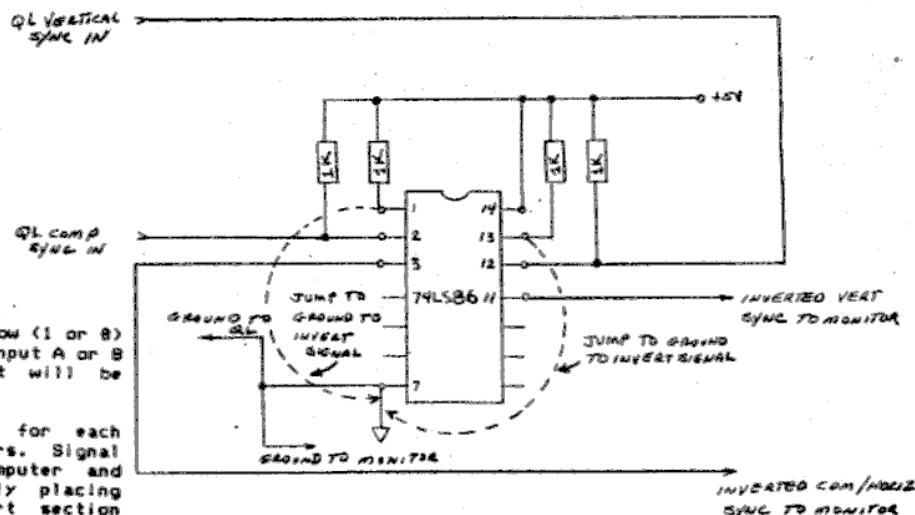
If you still have a problem, you can call me at home most evenings between 7:30 and 9:00 at 516-541-2271 or you may consider attending our next LIST meeting at the Huntington Library with your QL and Monitor.

Best of luck

Bob Gilder
Bob Gilder



LIST.



April

Joe C. Smith Jr.
P.O. BOX 20000 ALBUQUERQUE, NM 87101

"64 CHARACTERS" AND A CLEAR SCREEN

Mr. Paul Donnelly
Box 438
Centerport, N.Y. 11721

Dear Mr. Donnelly:

I have enclosed a copy of the book "200 Computer Programs in BASIC for the T/S-1000 1/1-81 2/5-2068".

I hope you will enjoy using the many fine programs which are listed in it.

At \$7.95 a copy, I feel I succeeded in my endeavor to offer a large quantity of good original programs at a very inexpensive price to fellow T/S owners and users.

As you will see, offering the book in a binder format will allow purchasers to store their own programs at the back of the book. I feel this is a good idea.

I am thinking about compiling another Software book for the T/S computers. If you would like to submit someone programs I will include them in the second book with the same agreement as before.

Again, Thank You.

Sincerely,

Joe C. Smith Jr.
Joe C. Smith Jr.

Here are some samples of the
Programs in Joe's New Book
We'll review it in an up
coming issue of LISTING

"RENUMBERING ROUTINE"

Attach these lines to the end of a basic program. Enter GOTO 9991- in the immediate mode - and the computer will renumber any basic program counting in intervals of 5. If you wish to change the numbering interval, change the value of N and the 5 in line 9995. Remember to change GOTOs and GOSUBs after the program has been renumbered.

Created by: Steven Kaye; Submitted by and with permission from the ZX USERS Group of New York.

```
9991 LET B=16509
9992 LET N=5
9993 POKE B,INT (N/256)
9994 POKE B+1,N-256*INT (N/256)
9995 LET N=N+5
9996 LET B=B+1
9997 IF 256*PEEK B+PEEK (B+1)=9990
THEN STOP
9998 IF PEEK (B-1)=118 THEN GOTO 9
999
9999 GOTO 9996
```

Some of the Programs are
100's of lines long & they
cover everything from math
to games to domestics.

Use this program in conjunction with your users manual. This is the way you begin to work with 64 characters on the screen. You need to shuffle everything around inside the computer's RAM memory and that is exactly what this routine does. Follow the prompts in the REM statements and you should not have any troubles.

Created by: Doug Dewey of Triangle Users Group, North Carolina; Submitted by and with permission from the ZX USERS Group of New York.

1 REM This program allows the user to reallocate various different components of RAM memory and make way for a clear screen in the 64-character mode. See page 254 for the different display file/memory maps and pages 247 and 248 for the codes for variable b.

```
2 REM Call this routine by PRINT
USR 63000
5 CLEAR 62999
7 PRINT "Please input b": INPUT b
10 LET a=63000
20 READ n: POKE a,n
30 LET a=a+1: GOTO 20
40 DATA 243,62,1,211,244,219,255,2
03,255,211,255,62,b,245,251,205,14
2,14,243,219,255,203,191,211,255,1
75,211,244,241,254,128,3,2,3,50,19
4,92,251,201
```

"ANAGRAM"

This program will make GOOD and BAD Anagrams of words you Input. It will fit in 1K.
Created by: Jody Koenig; Decorah, Iowa.

```
1 REM ANAGRAM
10 INPUT A$
15 DIM D(LEN A$)
17 LET A=1
20 FOR C=1 TO LEN A$
30 LET X=INT (1*LEN A$*RND)
40 FOR B=1 TO LEN A$
50 IF X=D(B) THEN GOTO 30
60 NEXT B
70 PRINT A$(X)
72 LET D(A)=X
75 LET A=A+1
80 NEXT C
85 PRINT
90 GOTO 15
```

Cedric R. Bastiaens

Mt. Sinai, NY 11766

15 February, 1986

Dear Paul,

Sorry about printing my name in such obnoxiously large letters; I unwittingly left the print mode of my typewriter in the expanded font.

Please find enclosed two prints of a LIST-Logo, that you might find interesting. If you think that one of both of them could "beautify" our News Letter Heading, feel free to use them.

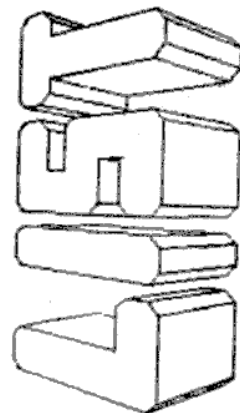
I created them on VU-10 and the sectioned version just about eats up all of the available RAM!

I have the data on disk, as well as the screens of these particular depictions.

If you like them, and you wanna use them, but also need other sizes, let me know of your needs and I will crank out a few more.

Cordially,

Cedric R. Bastiaens



LONG ISLAND
SINCLAIR TIMEX GROUP

Annual Dues.....\$15.00 Issue Price \$1.50 (includes P&P) - Double Issues \$3.00

One "Sample" copy sent upon receipt of large SASE.

Copies provided on exchange basis with other bona fide user groups.

L.I.S.T.-ing is published monthly by LIST (Long Island Sinclair Times) Group, a non-for-profit users group.

NOTE: PARTIAL YEAR MEMBERSHIPS AVAILABLE

Normal membership year is Feb. through Jan. at cost of \$15.00 (US) by keeping as many members as possible on that basis, we keep our costs and chances of error down.

If you wish to begin subscribing later in the year, please sign up for the end of this year and all of next.

We will accept partial years or different subscription runs, on a limited basis (particularly from members outside the U.S.) But, please be aware that, in addition to possible rate increases, your "account" must be handled "by hand" and errors may occur. International (ex Canada) subscribers will receive as many issues as we can afford to mail.

POLICY OF CONTRIBUTED MATERIAL:

We are always looking for interesting articles, programs, reviews etc., to keep our members informed and entertained. Articles submitted for publishing are printed on the following basis.

- 1) You, the writer, maintain the full copyright and can resell, lend or give away your work, as you wish.
- 2) We are granted the right to publish your material, in the original issue in which it appears. Reprints (e.g., to supply orders for back issues) will include your material as a part of its original issue. We are not allowed to sell your material in any other way, without your express written consent.

We can't (for now) pay you for your material, but you will receive a copy of the issue in which it is published, even if you're not a member. You may get more than one issue and you will definitely earn the respect and appreciation by your grateful peers.

©Copyright 1986, LIST Group. No portion of this publication may be reproduced, in any form, without the express written consent of LIST or the original author.

Articles represent the opinion of the author and not necessarily the LIST Group. LIST disclaims any responsibility for anything you may do to your computer as a result of reading any article in LIST-ing.

Please note our new address - PO BOX 438, Centerport, N.Y. 11721-0438
Mail sent to the old address must be forwarded there and will take longer to reach us.

NOTE: LIST Associates is not an official
organ of LIST Group

APRIL 1986

SPECIAL OFFER

TIRED OF WAITING MONTHS FOR LIBRARY TAPES?
FED UP WITH POOR QUALITY PRINTING IN YOUR
NEWSLETTER (CUT OFF PAGES, WASHED-OUT REDUCED
PRINT, NOT DARK ENOUGH)?
WANT TO GET YOUR NEWSLETTER SOONER & WITHOUT
POSTAL SERVICE DAMAGE?
LOOKING FOR PERSONAL SERVICE?
NEED A CONTACT WITH THE U.K.?

WAIT NO LONGER!

LIST ASSOCIATES, the people who first brought you cheap
Spectrum ROMs and Software from the UK, are now making a
special offer to LIST members.

JOIN LIST ASSOCIATES now and receive these special gold
member benefits.

1. LIST newsletter mailed to your home by registered mail.
2. LIST newsletter mailed to gold members before being mailed to exchange user groups.
3. Your own private copy of each new LIST library tape. Yours to keep.
4. Free postage paid envelope for return of the LIST "member" tape.
5. Guaranteed readable newsletter. Only the finest copies, printed on heavy weight bond paper.
6. Reprint service at a nominal fee.
7. Personal attention to your library tape and/or newsletter problems.
8. One free use of our personal answer service (answers to your questions directly from renowned experts in the field).
9. Optional, once per month, use of our answer service (Additional fees required)
10. Other special benefits yet to be announced.

LIST ASSOCIATES membership is reasonable too! We've priced our labor force's current market value and can provide all these services, and more, for the incredibly low price of just \$100/year. A one-time membership fee in LIST Associates of \$400 is also required. Send us your check for membership and annual usage of this service before April 30, 1986 and we'll even pay your next year's LIST dues - absolutely FREE!

SUPER BONUS

Date your check prior to April 1st, 1986 and we'll include a one time access to our personal answer service (a detailed response to your question) for only \$25. You save 50% on the normal one time fee of \$50 per request (annual rates are lower!)

Don't DELAY - JOIN TODAY!

Join the Golden Inner Circle of LIST

Send Check, Cash or Money Order to:

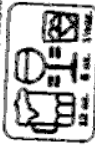
LIST ASSOCIATES - GOLD
PO Box 438
Centerport, N.Y. 11721-0438

DO IT NOW!

We reserve the right to sell our GIVE AWAY and REPLY card.
This offer void where prohibited by law.

A public service bulletin from Joseph E. Seagram & Sons, Inc.

All are equal
in alcohol content.



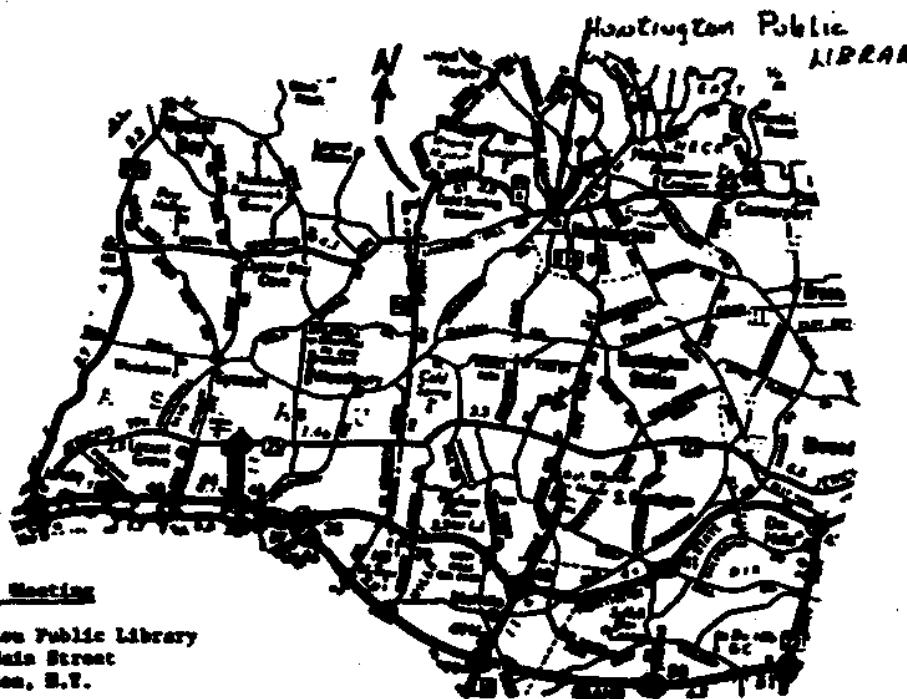
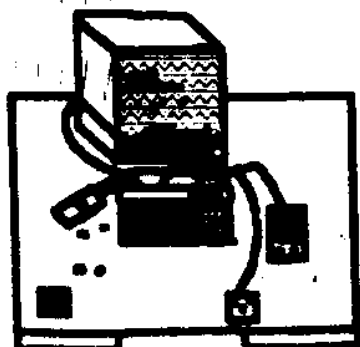
Bottles: 4.5% by volume; 100% by volume.
Liquor: 50 proof or 90% by volume.



LIST

8290-TZ/TT 'A'N 'MAGNIFIED
CENTROFOT, N.Y. 11721-0338
P.O. BOX 438
LIST

Long Island
Sinclair Cinema
Group
Huntington, N.Y.
Library
2 PM



Meeting

Huntington Public Library
RT 25A Main Street
Huntington, N.Y.

April 13 . . 1986 (Sunday)

at 2:PM

L.I.E. or N.S.P. to Rt 110 N.
Follow 110 across RT 25 to RT 25A
Go left on 25A. Library is 4 blocks
down on the left.